

REMARKS

Claims 1-31 are pending in this application. Claims 1-31 stand rejected.

Claims 17 and 31 have been amended to further clarify that the wavelength converter directly converts the wavelength of the source light of about 315 nm to about 400 nm to a wavelength of about 193 nm. It is respectfully submitted that no new matter has been added by the present amendment.

The Examiner's reconsideration of the rejection is respectfully requested in view of the above amendment and the following remarks.

Rejections under 35 U.S.C § 103:

I. Claims 1-4, 7-9, 17, 20-22, 25-27 and 31 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. (U.S. 6,052, 173) in view of Ohtsuki et al. (U.S. 6,078,598).

Claims 1, 17 and 31 are not rendered obvious by Miura in view of Ohtsuki. Applicants respectfully submit that there is no motivation to combine Miura and Ohtsuki. The Examiner states that "Miura does not disclose a wavelength converter...However, Ohtsuki teach a wavelength converter (2). Thus, it would have been obvious to one ordinary skill in the art at the time of the invention was made to modify the apparatus of Miura by including a wavelength converter of a non-linear optical material utilized in a manner described above for at least the purpose of reducing energy loss." Applicants respectfully disagree. Miura describes an exposure light source comprising a lamp which emits UV radiation. Ohtsuki describes an optical element (2) converting a laser beam from a light source such as semiconductor laser. As such, the UV lamp of Miura and the semiconductor laser of Ohtsuki are vastly different light sources. Thus, one of ordinary

skilled in the art would not look to the optical element (2) in Ohtsuki converting a laser beam from the semiconductor laser to convert a wavelength of UV radiation from the UV lamp in Miura. Furthermore, the motivation provided in the Office Action with regard to the energy loss in laser technology described in Ohtsuki bears no relation to a device for exposing a wafer using a UV radiation from a lamp in Miura.

Claims 17 And 31 Are Allowable For Additional Reasons

Amended claims 17 and 31 recite, *inter alia*, “a wavelength converter which directly converts a wavelength of the source light of about 315nm to about 400nm to a wavelength of about 193 nm.” For example, a source light having a wavelength of 365nm is directly converted into 182.5nm after passing the wavelength converter 500. *See e.g.*, Fig. 5 of the present application.

Applicants respectfully submit that neither Miura, Ohtsuki, nor any combination thereof teaches or suggests the above-claimed features. As stated in the Office Action, Miura does not disclose a wavelength converter. For this element, the Office Action relies on Ohtsuki.

Ohtsuki states:

The nonlinear optical crystals that can be used in this case are an LBO crystal (LiB_3O_5), which converts light with a wavelength of 772 nm emitted from the alexandrite crystal laser medium 1 into light with a wavelength of 386 nm, and an SBBO crystal ($\text{Sr}_2\text{Be}_2\text{B}_2\text{O}_7$), which converts the light with a wavelength of 386 nm emitted from the LBO crystal into light with a wavelength of 193 nm. (Ohtsuki, Col. 14, lines 18-25).

As such, Ohtsuki does not disclose or suggest a wavelength converter which directly converts a wavelength of the source light of about 315nm to about 400nm to a wavelength of about 193 nm. In contrast, Ohtsuki describes an optical element (2) which

performs multiple conversion steps to convert a wavelength of 772nm into 386nm, and then into 193nm using at least two crystals (e.g., LBO crystal and SBBO crystal). Accordingly, the optical element (2) in Ohtsuki does not directly convert the source light of about 315nm to about 400nm to a wavelength of about 193nm.

Accordingly, even assuming, *arguendo*, that the references were combined, the combination does not disclose or suggest “a wavelength converter which directly converts a wavelength of the source light of about 315nm to about 400nm to a wavelength of about 193 nm.” Thus, claims 1, 17 and 31 are not rendered obvious by Miura in view of Ohtsuki.

As claims 2-4 and 7-9 depend from claim 1, and claims 20-22 and 25-27 depend from claim 17, they are also not rendered obvious by Miura in view of Ohtsuki for at least these reasons.

Accordingly, withdrawal of the obviousness rejections is respectfully requested.

II. Claims 5 and 23 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. in view of Ohtsuki and further in view of Tanaka et al. (US 5,811,211).

As stated above for claims 1 and 17, there is no motivation to combine Miura and Ohtsuki. Further, Miura and Ohtsuki do not disclose or suggest a wavelength converter which directly converts a wavelength of the source light of about 315nm to about 400nm to a wavelength of about 193 nm, as recited in claim 17. Tanaka at the very least does not cure the above mentioned deficiency of Miura and Ohtsuki with respect to the wavelength converter recited in claims 1 and 17.

As claims 5 and 23 depend from claims 1 and 17, respectively, these dependent claims are likewise patentable over Miura in view of Ohtsuki and further in view of Tanaka.

Accordingly, withdrawal of the obviousness rejections is respectfully requested.

III. Claims 6, 10-14, 18-19 and 24 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. (U.S. 6,052, 173) in view of Ohtsuki and further in view of Yamamoto (US 4,905,037).

As stated above for claims 1 and 17, there is no motivation to combine Miura and Ohtsuki. Further, Miura and Ohtsuki do not disclose or suggest a wavelength converter which directly converts a wavelength of the source light of about 315nm to about 400nm to a wavelength of about 193 nm, as recited in claim 17. Yamamoto at the very least does not cure the above mentioned deficiency of Miura and Ohtsuki with respect to the wavelength converter recited in claims 1 and 17.

As claims 6, 10-14, 18-19 and 24 depend from claims 1 and 17, respectively, these dependent claims are likewise patentable over Miura in view of Ohtsuki and further in view of Yamamoto.

Accordingly, withdrawal of the obviousness rejections is respectfully requested.

IV. Claims 15-16 and 29-30 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Miura et al. (U.S. 6,052, 173) in view of Yamamoto et al. (U.S. 4,905,037) and further in view of Minemoto et al. (US 5,381,429).

As stated above for claims 1 and 17, there is no motivation to combine Miura and Ohtsuki. Further, Miura, Ohtsuki and Yamamoto do not disclose or suggest a wavelength converter which directly converts a wavelength of the source light of about 315nm to

about 400nm to a wavelength of about 193 nm, as recited in claim 17. Minemoto at the very least does not cure the above mentioned deficiency of Miura, Ohtsuki and Yamamoto with respect to the wavelength converter recited in claims 1 and 17.

As claims 15-16 and 29-30 depend from claims 1 and 17, respectively, these dependent claims are likewise patentable over Miura in view of Yamamoto and further in view of Minemoto.

Accordingly, withdrawal of the obviousness rejections is respectfully requested.

For the foregoing reasons, the present application, including claims 1-31, is believed to be in condition for allowance. The Examiner's early and favorable action is respectfully requested. The Examiner is invited to contact the undersigned if he has any questions or comments in this matter.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Jaewoo Park", is written over a horizontal line.

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